

**Application No.: 10/590,010**

**REMARKS**

These amendments and remarks are filed in response to the final Office Action dated July 23, 2009. In view of these amendments and remarks, this application should be allowed and the case passed to issue. No new matter is introduced by these amendments. Support for the amendment to the claims is found throughout the specification, including: page 1, lines 10-17; page 4, lines 5-11; page 8, lines 13-15; page 9, lines 6-14; and page 10, lines 11-17; and Fig. 4.

Claims 2-10 are pending in this application. Claims 2-10 have been rejected. Claims 6-8 are amended in this response. Claim 1 was previously canceled.

***Claim Rejections Under 35 U.S.C. § 112***

Claim 7 was rejected under 35 U.S.C. § 112, second paragraph, as being indefinite because it is not clear what a "W-type" cage is. This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

In view of Fig. 4 and page 8, lines 13-15 of the specification, it is clear what is meant by "wavy-shaped." Clearly, it means that the cage is shaped like a wave. Fig. 4 clearly depicts a square wave. Claims "must be read in view of the specification, of which they are a part." *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005). Therefore, the shape of a "square wave" is clearly understood from the present specification and Figures. To further illustrate that the shape of square waves are well-known, the Examiner is directed to the following URL:

[http://en.wikipedia.org/wiki/Square\\_wave](http://en.wikipedia.org/wiki/Square_wave).

In order to advance prosecution of this application, claim 7 has been amended to more clearly define the claimed invention. For the Examiner's convenience a marked-up drawing to facilitate the understanding of claim 7, is attached as Appendix A.

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***Claim Rejections Under 35 U.S.C. § 103***

Claims 2-5 and 8 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ikezawa et al. (US 5,630,668) in view of Pitner (US 3,163,478). The Examiner asserted that Ikezawa et al. disclose a thrust needle bearing employing lubricating oil having a rolling element held by a cage wherein the arithmetic average roughness Ra of the rolling element set to at least 0.3 micrometers and at most 0.15 micrometers. The Examiner acknowledged that Ikezawa et al. do not disclose a range for the clearance.

Claims 6, 7, 9, and 10 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Pitner (US 3,163,478). The Examiner averred that Pitner discloses a thrust needle bearing employing lubricating oil and having a rolling element (10) held by a cage (2) wherein a clearance exists between a pocket guide face of the cage and rolling element. The Examiner acknowledged that Pitner does not disclose a range for the clearance, but maintained that it would have been obvious to select a clearance within the claimed range for the desired purpose of allowing a lubricating wedge of oil to achieve the desired lubricating characteristics.

These rejections are traversed, and reconsideration and withdrawal thereof respectfully requested. The following is a comparison between the invention, as claimed, and the cited prior art.

Pitner and Ikezawa et al., whether taken in combination, or taken alone, do not suggest the claimed thrust needle bearings because Pitner and Ikezawa et al. do not suggest the cage has a cage pocket, in which the rolling element is stored to come in contact with a pocket guide face thereof constituted by a shear plane formed through pressing for the cage pocket, and the clearance between the pocket guide face of said cage and the rolling element is set to at least 60  $\mu\text{m}$  and at most 130  $\mu\text{m}$ , as required by claim 6; and the cage has a cage pocket, in which the

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rolling element is stored to come in contact with a pocket guide face thereof constituted by a shear plane formed through pressing for the cage pocket, the clearance between the pocket guide face of the cage and the rolling element is set to at least 60  $\mu\text{m}$  and at most 130  $\mu\text{m}$ , and the value of the arithmetic average roughness Ra of the rolling element coming into contact with the shear plane is set to at least 0.03  $\mu\text{m}$  and at most 0.15  $\mu\text{m}$ , as required by claim 8.

Furthermore, the cited references do not suggest the unexpected improvement in depth of wear of roller, 10 % life, and life ratio, provided by thrust needle bearings according to the present invention, as shown in Tables 3 and 4 of the specification. In fact, the results achieved by the present invention are counterintuitive because the present invention is superior to thrust needle bearings having smoother surfaces! Further as regards claim 8, the cited prior art does not suggest the synergy achieved by the combination of the claimed rolling element smoothness and clearance between a pocket guide face of the cage, as explained in the specification on pages 8 and 9.

Although Ikezawa et al. recite a cage that is made by pressing (col. 13:9-11 and col. 21:66 to col. 21:1), the recitation regarding pressing in Ikezawa et al. is concerned with exemplary tests for effects of surface treatment, and the surface of the cage formed by pressing is covered with a solid lubricant or has a compound formed thereon (see col. 12:5-12). Therefore, the shear plane formed through the pressing is not exposed. Although Tables 2 and 3 of the Ikezawa et al. list cages that have not been exposed to "surface treatment," there is no indication that these cages were formed through pressing, as required by the present claims.

In addition to not disclosing that the rolling element comes into contact with the pocket guide face constituted by the shear plane formed through pressing, Ikezawa et al. also do not teach that the surface roughness Ra of the rolling element coming into contact with the shear

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plane, is set to at least 0.03  $\mu\text{m}$  and at most 0.15  $\mu\text{m}$ , as required by claim 8. Ikezawa et al. provide an invention regarding a roughness of a coating of a solid lubricant formed on a surface of a cage (see claim 1). Ikezawa et al. prevent friction of the rolling element by forming a coating on the cage, whereas, in the present invention, friction is prevented by defining the surface property of the cage through pressing, without the high cost processing steps of Ikezawa et al. Thus, the present invention is completely different from Ikezawa et al. In the present invention, the rolling element has a relatively rough arithmetic average roughness Ra of 0.03 to 0.15  $\mu\text{m}$ , as required by claim 8.

Pitner also fails to disclose that the rolling element comes into contact with the pocket guide face constituted by the shear plane formed through pressing, as required by claims 6 and 8. In addition, Pitner does not disclose a clearance between a pocket guide face and a rolling element is set in the range of 60-130  $\mu\text{m}$ , and that the surface roughness Ra of the rolling element coming in contact with the shear plane is set to at least 0.03  $\mu\text{m}$  and at most 0.15  $\mu\text{m}$ .

Setting the clearance in the range of 60-130  $\mu\text{m}$  to provide a roller with a reduced depth of wear and improved life was discovered by the present inventors through the experiments shown in Tables 3 and 4. Such improvements were discovered by the present inventors, and there is no suggestion of such improvements, experiments, and analyses by Pitner and Ikezawa et al. Hence, one of ordinary skill would not have arrived at the present invention in view of Pitner and Ikezawa et al., and it would clearly not have been just a matter of design choice to set the clearance in the range of 60-130  $\mu\text{m}$ .

The Examiner did not point out any deficiencies in the arguments of unexpected results as it pertains to the data in Tables 3 and 4, though, the Examiner noted in the Advisory Action that none of the asserted unexpected result parameters were recited in the claims. Thus, it

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appears the Examiner misunderstands the concept of unexpected results, and has not properly considered the evidence in Tables 3 and 4, for there is no requirement that the parameters for which unexpected results are asserted need be recited in the claims (see MPEP § 716.02).

Unexpected results are not claim limitations, rather they are evidence of nonobviousness.

Obviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge readily available to one of ordinary skill in the art. *In re Kotzab*, 217 F.3d 1365, 1370 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). There is no suggestion in Pitner or Ikezawa et al. to modify a thrust needle bearing to provide a cage having a cage pocket, in which the rolling element is stored to come in contact with a pocket guide face thereof constituted by a shear plane formed through pressing for the cage pocket, and the clearance between the pocket guide face of said cage and the rolling element is set to at least 60  $\mu\text{m}$  and at most 130  $\mu\text{m}$ , as required by claim 6; and a cage having a cage pocket, in which the rolling element is stored to come in contact with a pocket guide face thereof constituted by a shear plane formed through pressing for the cage pocket, the clearance between the pocket guide face of the cage and the rolling element is set to at least 60  $\mu\text{m}$  and at most 130  $\mu\text{m}$ , and the value of the arithmetic average roughness  $R_a$  of the rolling element coming into contact with the shear plane is set to at least 0.03  $\mu\text{m}$  and at most 0.15  $\mu\text{m}$ , as required by claim 8.

The only teaching of the claimed thrust needle bearings is found in Applicant's disclosure. However, the teaching or suggestion to make a claimed combination and the reasonable expectation of success must not be based on applicant's disclosure. *In re Vaeck*, 947

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F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The Examiner's unsupported, conclusory assertions are not sufficient to establish a prima facie case of obviousness.

In view of the above amendments and remarks, Applicants submit that this application should be allowed and the case passed to issue. If there are any questions regarding this Amendment or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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## APPENDIX A

Reference Figure

